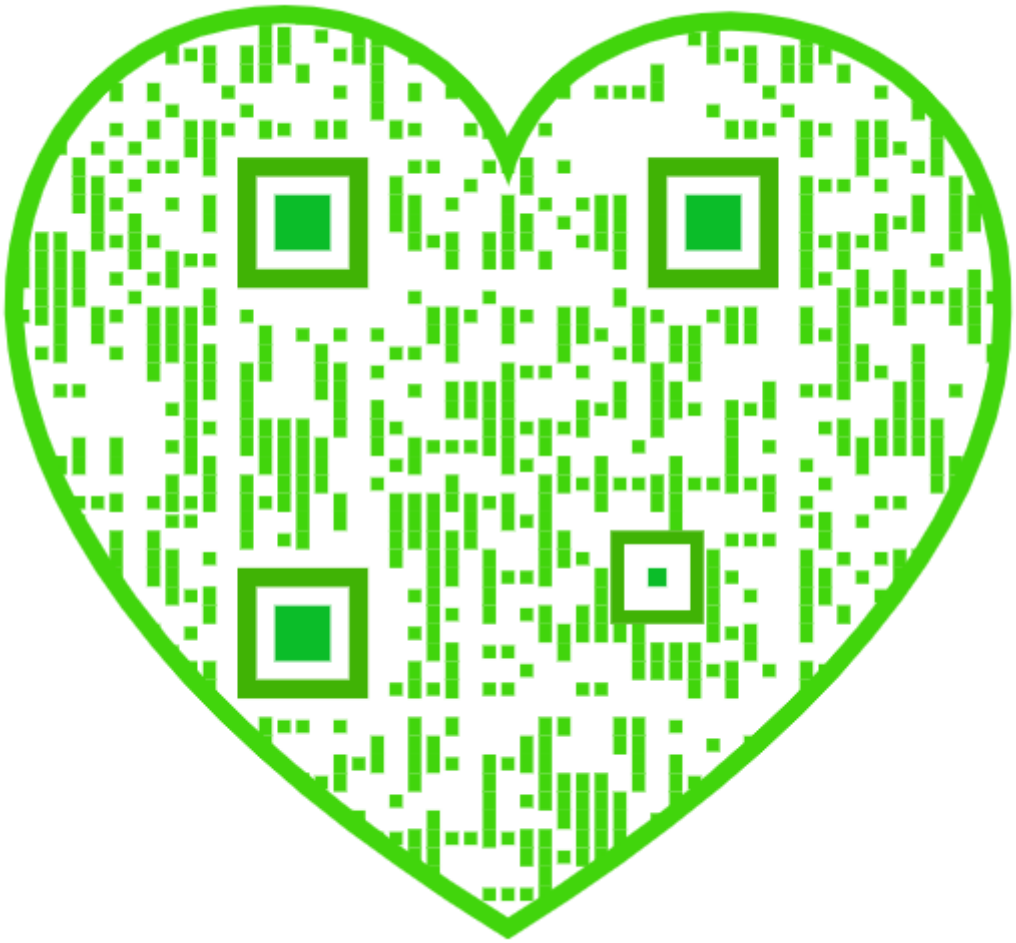
FULL AUTO

RUGER MINI-14
FULL AUTO
CONVERSION MANUAL



Full Auto Ruger Mini-14 Conversion Manual

WARNING !

The legal construction and possession of a fully automatic weapon is controlled by the Bureau of Alcohol, Tobacco, and Firearms division of the U.S. Treasury Department.

Proper application to the B.A.T.F., authorization, and permission must be secured before constructing this or any other similar device. Local and state laws vary and may restrict ownership of this or similar type weapons.

Severe penalties are authorized for violators of these laws. Minuteman Publications offers this information for academic study of firearms design and disclaims any responsibility or liability for the improper or illegal use of this or other similar devices.

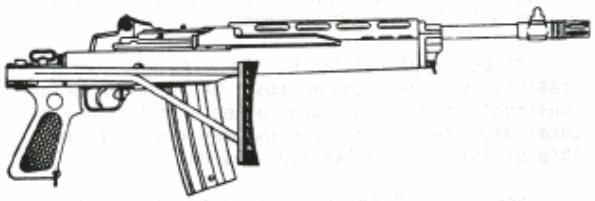


Table Of Contents

CONTENTS PAGE

Introduction 7

Blueprint Index 9

Chapter 1
General Description And Mode Of Operation
Semi Automatic 13

Chapter 2
General Description And Mode Of Operation
Full Automatic 21

Chapter 3
Modifications To Be Made To Weapon 29

Chapter 4
New Parts To Be Manufactured 39

Chapter 5
Material For Construction 51

Introduction

The purpose of this manual is to provide the necessary blueprints and manufacturing information for conversion of the semi-automatic civilian version, RUGER MINI-14 into a fully automatic weapon capable of firing multiple bursts, being fully controlled by the firer.

The modification will be fully described later, but basically consists of alterations to the receiver, stock, and a sear group, and also the manufacturing of a disconnector assembly. The weapon can be converted to fire fully automatic or be restored back to semi-automatic in little more time than it takes to field strip it. This conversion does not provide selective fire capability. It is very reliable and rugged due to its design and manufacture.

This manual presents the necessary data that would be required by a machinist or gunsmith to complete all modifications to the gun and to manufacture the required components. Engineers design weapons such as this with a great deal of care, and for successful operation care must also be exercised in the manufacturing procedures to be explained regarding this conversion.

Blueprint Index

1. OPERATING SEQUENCE - SEMI AUTOMATIC

   A. Hammer cocked, engaged with trigger sear.

   B. Trigger is depressed releasing hammer to strike the firing pin and detonate the cartridge. Secondary sear moves forward slightly.

   C. The trigger is still depressed. The slide and bolt have cycled rearward causing the hammer to be forced rearward and engage the secondary sear.

   D. The slide and bolt have cycled forward stripping a cartridge from the magazine. The trigger is released and the secondary sear releases the hammer as the trigger sear engages and holds the hammer, ready for the next firing cycle.

2. OPERATING SEQUENCE - FULL AUTOMATIC

   A. Hammer cocked, engaged with trigger sear. The disconnector assembly is shown in position.

   B. The trigger is depressed releasing the

hammer to fire the cartridge.

C. With the trigger still depressed, the slide and bolt have cycled rearward forcing the hammer to engage the secondary sear which had previously moved forward slightly as the slide unlocked the bolt and moved rearward.

D. The slide and bolt move forward under recoil spring pressure. Just before the slide stops it makes contact with the tripping lever, forcing it forward. As the tripping lever pivots the disconnector forces the secondary sear rearward and releases the hammer to fire another cartridge.

E. The trigger is released allowing the hammer to engage the trigger sear. The firer has only to depress the trigger to resume automatic fire.

3. PARTS TO MODIFY

   A. Receiver

   B. Slide

   C. Secondary Sear

   D. Stock

4. PARTS TO BE MANUFACTURED

   A. Screw-Pivot, Tripping Lever

   B. Tripping Lever

   C. Bushing, Tripping Lever

   D. Disconnector

   E. Pin-Disconnector and Tripping Lever Assembly

   F. Pin-Disconnector, Secondary Sear Engagement

   G. Clip-Retaining-Disconnector Pin

   H. Fixtrue-For holding secondary sear while machining.

1

General Description And Mode Of Operation–Semi Automatic

SPECIFICATIONS

The RUGER MINI-14 rifle is a gas operated, semi-automatic firearm chambered for the .223 (5.56mm) caliber U.S. military and commercially manufactured cartridges. It is box magazine fed with magazines available to hold 5, 10, 20, 30, and 40 rounds each. A 75 round rotary drum magazine is also available.

The MINI-14 takes its basic mechanical properties from the U.S. military Garand family of weapons, somewhat resembling a scaled-down M-14 externally. The internal parts of the MINI-14 have had several minor changes from the military M-14 rifle.

Hardened chrome molybdenum steel is used in the breech and firing mechanisms. Spring reliability is provided through the use of music wire coil springs.

The MINI-14 has become very popular since its introduction in 1972. Many law enforcement agencies and some governments are choosing the MINI-14 for specialized and general applications.

One of the contributing factors to its popularity is its reasonable cost. 1982 prices

of approximately $285.00 for the blue version and $350.00 for the stainless gun make it a good investment. Compared to the approximate $540.00 required for a Colt AR-15 and an extra $100.00 to $150.00 for the parts to convert it to full auto, the RUGER is a practical choice for many people with inflation riddled budgets.

OPERATION

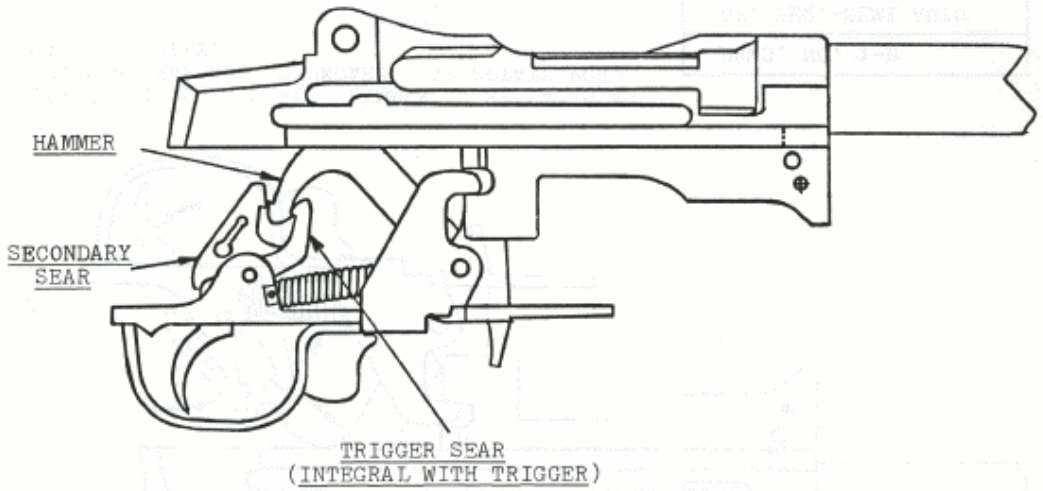
The semi-automatic mode of operation consists of the following steps:

1. The firer inserts a loaded magazine into the rifle.

2. The slide is then pulled rearward until it stops, and then is released sharply thereby allowing the bolt, propelled forward under recoil spring tension, to strip a live round from the magazine and chamber it during forward movement. As the bolt face contacts the breech of the barrel, a camming surface in the slide rotates the bolt forcing two locking lugs into matching recesses in the receiver. This will prevent the bolt from moving rearward during the initial high pressure following detonation of the cartridge. At this point, the hammer is cocked and held back by an engagement between the sear notch on the trigger and the hammer. (See drawing # 1A)

3. With the safety having been moved forward to "off", the firer then depresses the trigger which disengages the hammer from the trigger sear. In this same motion of the trigger,

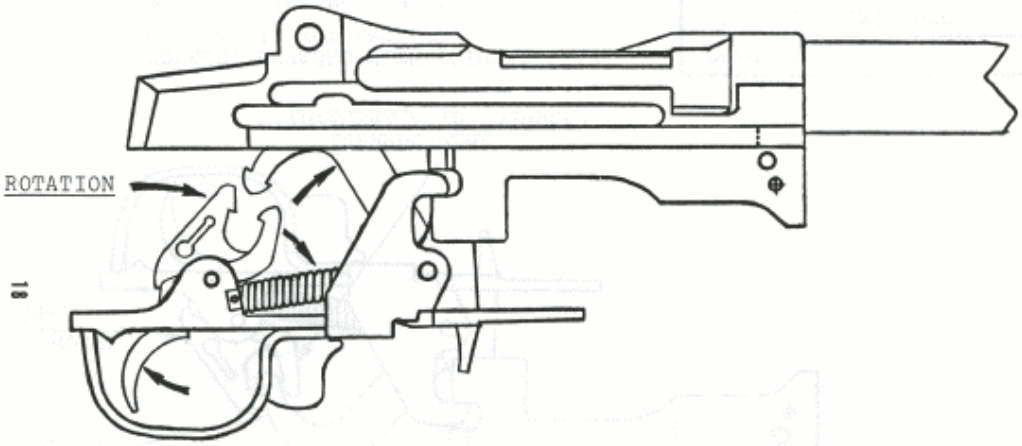
the secondary sear moves forward slightly. The hammer, under pressure from the hammer spring, is propelled forward, striking the firing pin and detonating the cartridge. (See drawing # 1B) The bolt will stay closed and locked until the chambered pressure drops to a safe level, and until a small amount of gas is vented from the barrel through the gas block blowing against the front of the slide with enough pressure to unlock the bolt (by reversing the camming action). The slide will then move rearward, carrying with it the bolt which extracts the spent cartridge and ejects it. The bottom of the bolt contacts and forces the hammer rearwards until it engages the secondary sear which will hold the hammer back. (See drawing # 1C) As the recoil spring compression overtakes the recoil inertia, the slide will reverse and move forward, carrying the bolt which again strips a live cartridge from the magazine and forces it into the chamber. When the trigger is released, the sear engagement with the hammer will change. The trigger sear engages the hammer just before the secondary sear disengages from the hammer and moves rearward to its original position. By this time the bolt is locked into the receiver again and pressure applied to the trigger will again release the hammer to fire the cartridge and repeat the cycle.



HAMMER COCKED, ENGAGED WITH TRIGGER SEAR.
SECONDARY SEAR IS NOT ENGAGED.

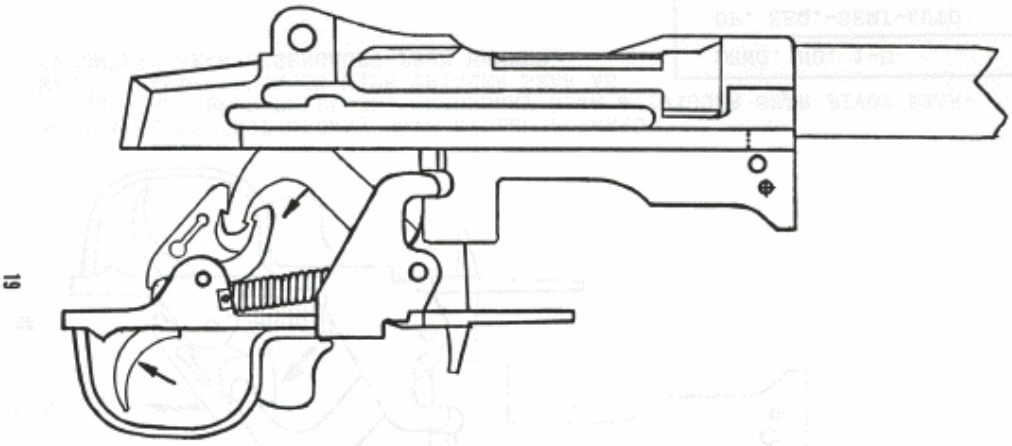
* NOTE-BOLT & SLIDE NOT SHOWN

DRWG. NO. 1-A
OP. SEQ. SEMI-AUTO



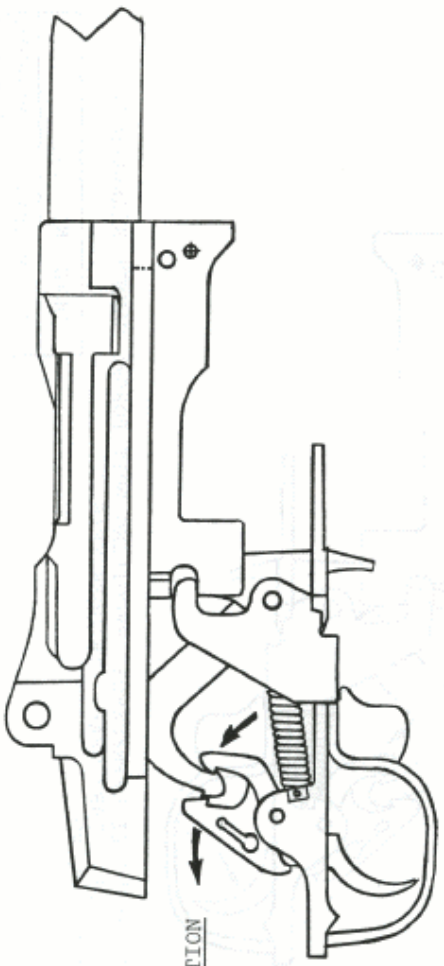
TRIGGER IS DEPRESSED. HAMMER IS RELEASED AS TRIGGER SEAR AND SECONDARY SEAR ROTATE FORWARD SLIGHTLY.

DRWG. NO. 1-B
OP. SEQ.-SEMI AUTO



TRIGGER STILL DEPRESSED: RECOILING BOLT FORCED HAMMER REARWARD TO ENGAGE SECONDARY SEAR. TRIGGER SEAR IS STILL FORWARD.

DRWG. NO. 1-C
OP. SEQUENCE-SEMI-AUTO



ROTATION

1. BOLT & SLIDE (NOT SHOWN) HAVE CYCLED FORWARD.
2. TRIGGER HAS BEEN RELEASED, SECONDARY SEAR & TRIGGER SEAR PIVOT REARWARD. HAMMER ENGAGES WITH TRIGGER SEAR AS SECONDARY SEAR DISENGAGES FROM HAMMER.

DRWG. NO. 1-D
OP. SEQ.-SEMI-AUTO

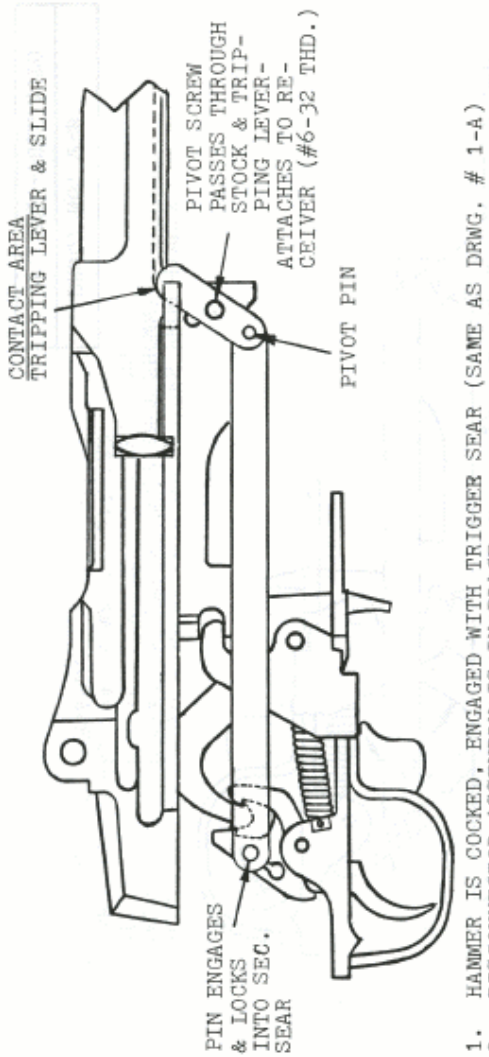
2

General Description And Mode Of Operation – Full Automatic

Before getting into the description of operation in the full-automatic mode, please refer to drawing # 2A which shows an overlay of disconnector assembly required for this conversion. This will help the reader better understand the sequence of operation.

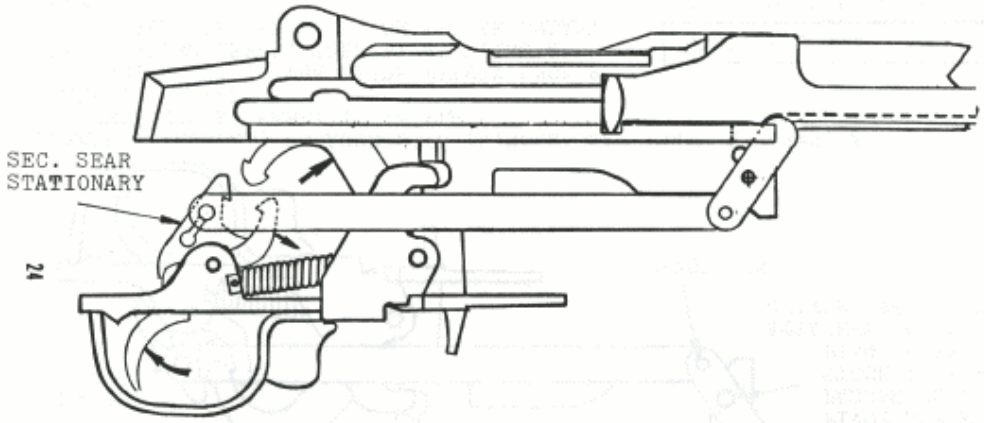
When the trigger is depressed, the trigger sear and hammer disengage, allowing the hammer to strike the firing pin and detonate the cartridge. The slide unlocks the bolt and recoils backwards, extracting the spent cartridge. The firer still has the trigger depressed. The hammer is caught and held back by the secondary sear as the bolt completes its rearward travel. (See drawing # 2C) Recoil spring pressure reverses the bolt travel which will then strip a live cartridge from the magazine and begin to chamber it. As the cartridge is fully chambered and as the bolt starts to rotate to lock, the slide is still not fully closed. It is at this time that it contacts a tripping lever and forces it forward. This forward movement of the tripping lever produces a rearward movement of the disconnector which is attached to the secondary sear. This movement forces the secondary sear rearward, releasing the hammer to strike the firing pin again. During the time necessary for the secon-

dary sear to disengage and for the hammer to strike the firing pin, the slide will have reached its furthermost forward travel and the bolt will be fully locked, ensuring safety to the firer. (See drawing # 2D) This firing sequence will repeat as long as the trigger is depressed and as long as cartridges are in the magazine. When the trigger is released, the trigger sear will engage and hold the hammer back in the cocked position. Applied pressure by the firer to the trigger will resume automatic firing.



1. HAMMER IS COCKED, ENGAGED WITH TRIGGER SEAR (SAME AS DRWG. # 1-A)
2. DISCONNECTOR ASSEMBLY IS IN PLACE
3. SLIDE IS FORWARD
4. THE RADIUS CUT IN THE SLIDE BARELY ENGAGES THE TRIPPING LEVER, THEREBY APPLYING A SLIGHT REARWARD PRESSURE ON THE SECONDARY SEAR

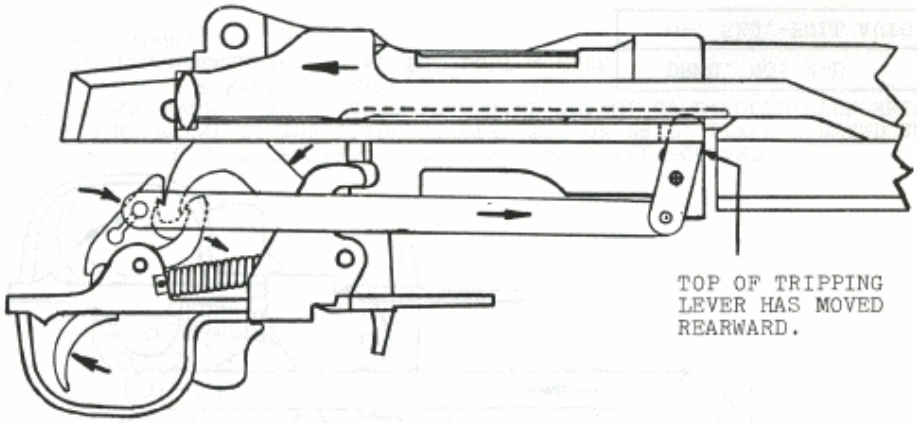
DRWG. NO. 2-A
OP. SEQ.-FULL-AUTO



24

1. TRIGGER IS DEPRESSED-TRIGGER SEAR DISENGAGES FROM HAMMER.
2. HAMMER ROTATES FORWARD TO STRIKE BOLT.(NOT SHOWN)
3. SLIDE IS STILL FORWARD, ENGAGED WITH TRIPPING LEVER. SECONDARY SEAR REMAINS REARWARD WHILE SLIDE IS FORWARD.

DRWG. NO. 2-B
OP. SEQ.-FULL AUTO

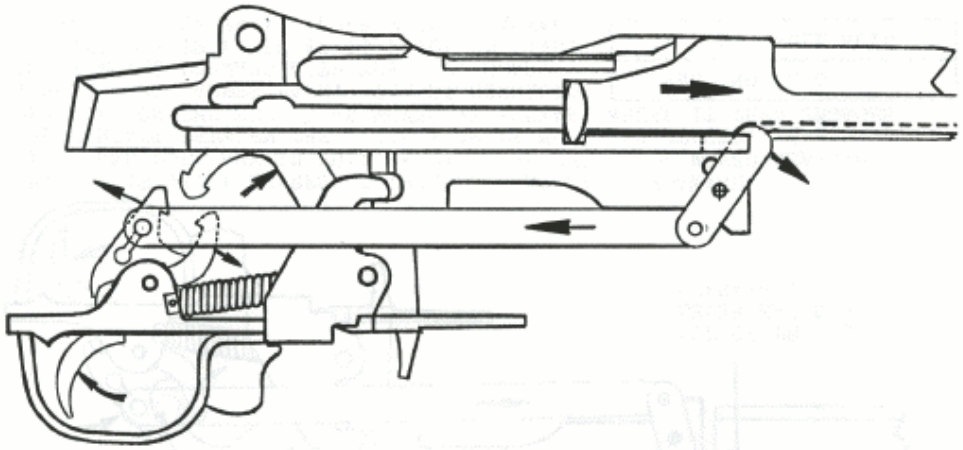


25

1. TRIGGER IS STILL DEPRESSED-TRIGGER SEAR STILL FORWARD.
2. SLIDE AND BOLT ARE IN FULL RECOIL. AS THE SLIDE MOVED REARWARD, THE CONTACT BETWEEN THE SLIDE & TRIPPING LEVER CEASED. SPRING PRESSURE ON THE SEC. SEAR MOVED IT FORWARD WHERE IT THEN ENGAGES & HOLDS THE HAMMER BACK. THE DISCONNECTOR ASS'Y MOVED PORWARD WITH THE SEC. SEAR, CAUSING THE TRIP. LEVER TO PIVOT ON PIVOT SCREW. TOP OF TRIP. LEVER MOVES REARWARD.

DRWG. NO. 2-C
OP. SEQ.-FULL AUTO

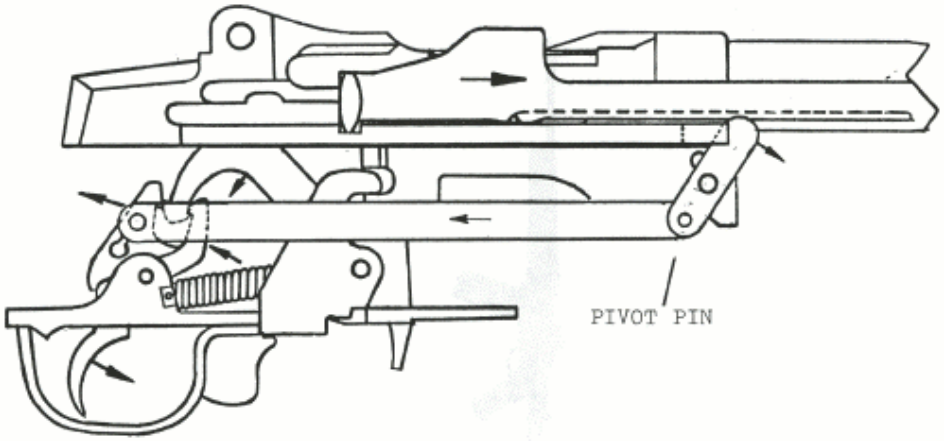
26



1. TRIGGER IS STILL DEPRESSED. TRIGGER SEAR STILL FORWARD.
2. FORWARD MOVEMENT OF THE SLIDE PIVOTED TOP OF TRIP. LEVER FORWARD AS CONTACT WAS MADE. THIS CAUSES REARWARD TRAVEL OF DISCONNECTOR WHICH MOVES SEC. SEAR REARWARD ALSO. THIS DISENGAGES THE HAMMER TO STRIKE THE BOLT & FIRE THE CARTRIDGE.

DRWG. NO. 2-D
OP. SEQ.-FULL AUTO

27



THE SLIDE AND BOLT ARE MOVING FORWARD-FEEDING A LIVE CARTRIDGE INTO THE CHAMBER. THE TRIGGER HAS BEEN RELEASED, CAUSING THE TRIGGER SEAR TO ENGAGE & HOLD THE HAMMER AS THE SEC. SEAR DISENGAGES. REARWARD PRESSURE APPLIED TO THE TRIGGER WILL RESUME FULL AUTO FIRE.

DRWG. NO. 2-E
OP. SEQ.-FULL AUTO

3

Modifications To Be Made To Weapon

1. Receiver - Drawing # 3A

A. Machine lug off of lower right side of receiver flush with adjoining surface as indicated in the drawing. This is required to provide clearance for the operation of the disconnector assembly.

B. A slot is machined into the upper flange as indicated. This provides clearance for the tripping lever which will extend through this flange.

C. A # 6-32 threaded hole is machined into the receiver as indicated for attachment of the Disconnector assembly with the pivot screw.

2. Slide - Drawing # 3B

A single cut is made into the slide as indicated on the drawing. This will provide clearance for the top of the tripping lever, and also establish a contact point which the tripping lever engages during the forward movement of the slide.

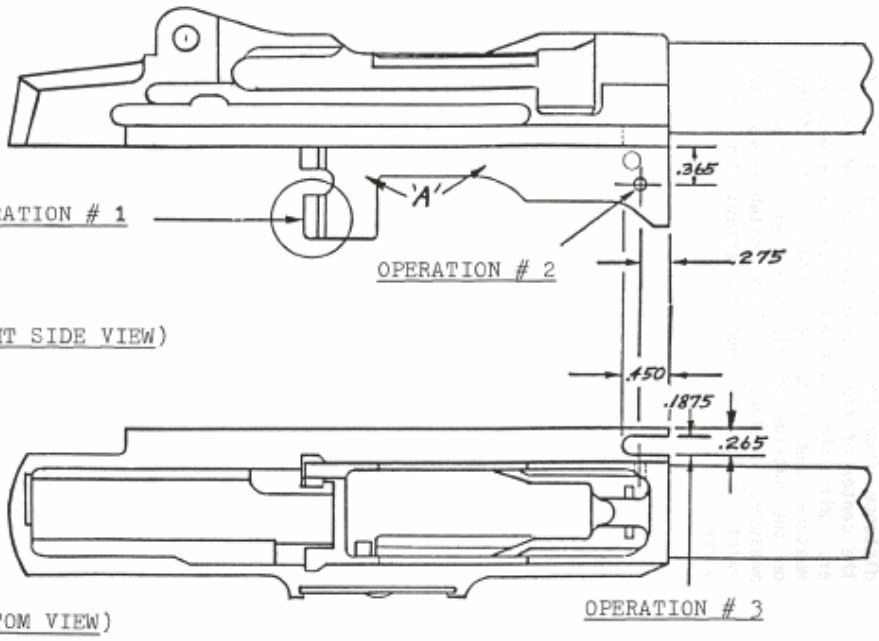
3. Secondary Sear - Drawing # 3C

The secondary sear is machined in such a manner as to provide an easy and quick method of assembling the Disconnector-Secondary Sear Pin to the Secondary Sear. The pin is inserted through the large hole in the secondary sear until the small diameter of the pin matches the slot in the secondary sear. Slide the pin over in the slot until the smaller of the two holes is reached, and then pull the pin out until it firmly locks with the secondary sear. The plastic retaining clip can then be attached to the small diameter of the pin to prevent the pin and sear from accidentally coming apart. Use the fixture previously described when machining this part.

4. Stock - Drawing # 3D

The stock must be machined to provide clearance for the disconnector assembly. The tolerance for these cuts are not critical, as long as adequate clearance is provided. However, the location of the pivot screw hole should be matched as closely as possible with the # 6-32 threaded hole in the receiver. This can be determined by scribing a vertical line on the receiver through the center line of the # 6-32 hole up onto the side of the flange. With the receiver in the stock, this line can be transferred back down on the outside of the stock to establish its vertical centerline. The horizontal centerline can be located by measuring the

distance from the bottom of the flange to the center of the # 6-32 hole, on the receiver. With the stock and receiver assembled, measure down from the bottom of the flange on the outside of the stock and scribe the measured distance. This establishes the point to be machined to accept the pivot screw.

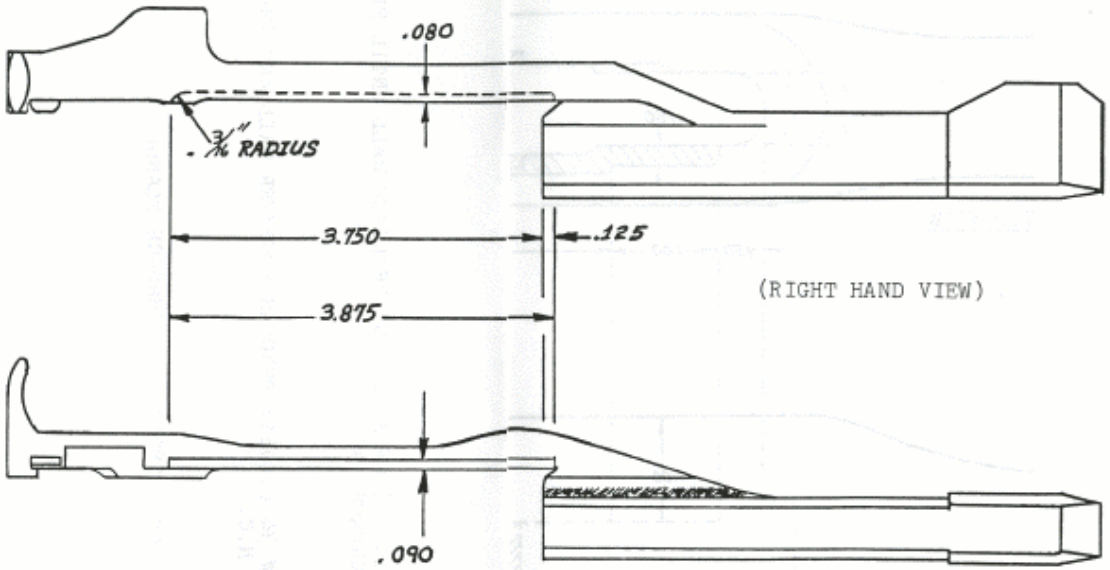


OPERATION # 1 - MILL RIDGE (LOWER) OFF OF RECEIVER WALL UNTIL FLUSH WITH SURFACE 'A'

OPERATION # 2 - DRILL # 36 (.1065) THROUGH RECEIVER WALL AND THREAD # 6-32 N.C.

OPERATION # 3 - MILL 3/16" (.1875) SLOT THROUGH FLANGE, .450 LONG

RECEIVER-MODIFIED	
FULL SCALE	DRWG. NO. 3-A



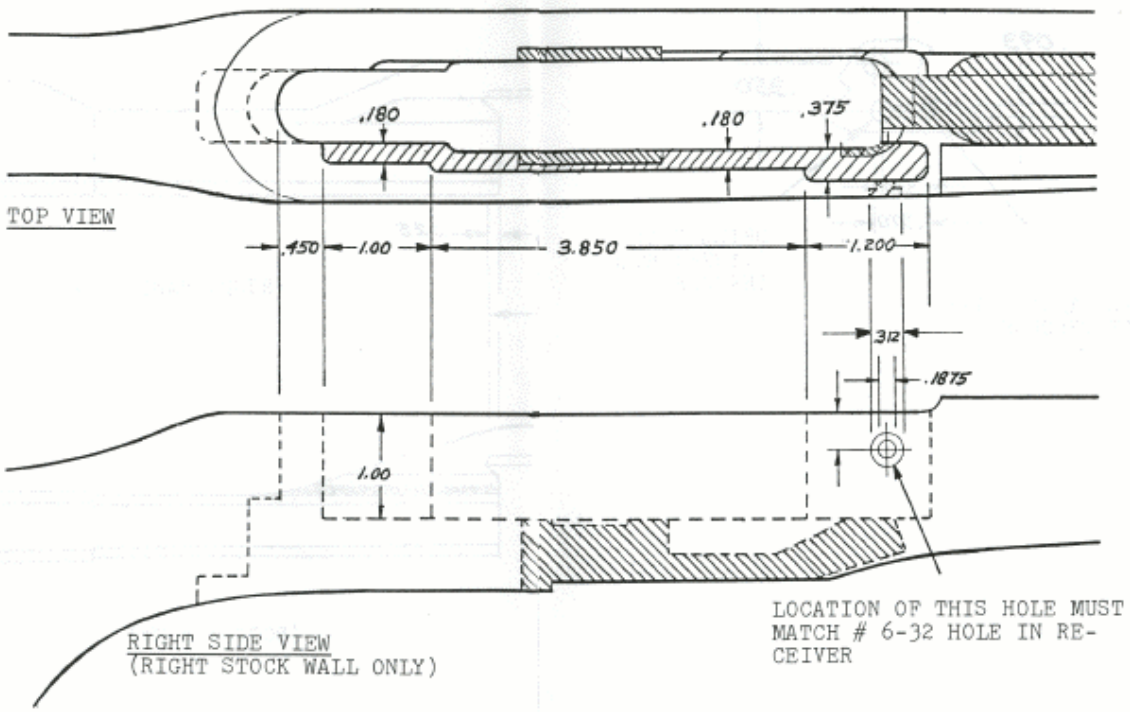
(RIGHT HAND VIEW)

(BOTTOM VIEW)

SLIDE-MODIFIED	
FULL SCALE	DRWG. NO. 3-B

SHADED AREA REPRESENTS MODIFIED PORTION OF STOCK

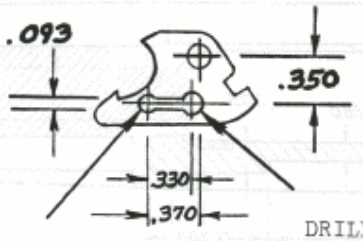
DIAGONAL LINES REPRESENT STEEL STOCK LINER



STOCK ASSEMBLY	
FULL SCALE	DRWG. NO. 3-D

MILL SLOT .093 WIDE BETWEEN 1/8" HOLE

AND 3/16" HOLE - ON CENTER LINE



DRILL 3/16"
(.1875) HOLE
THROUGH

DRILL 1/8" (.125)
HOLE THROUGH

SECONDARY SEAR	
FULL SCALE	DRWG. NO. 3-C

4

New Parts To Be Manufactured

1. Screw-Pivot, Tripping Lever - Drawing # 4A

   This screw will act as a pivot point for the tripping lever. It is designed with a shoulder that will bottom out against the receiver when installed. This will prevent binding between the tripping lever and the receiver.

2. Tripping Lever - Drawing # 4B

   The top of this lever will contact a portion of the slide each time the gun cycles. By means of a pivot in the center of the lever, the forward movement at the top of the lever causes the bottom of the tripping lever to move rearwards. It is by this action that rearward movement is provided to disengage the secondary sear during each cycle of the slide.

3. Bushing, Tripping Lever - Drawing # 4C

   This bushing is permanently attached to the tripping lever by flaring the small end after inserting it into the lever. It

is through this part that the pivot screw mounts the lever to the receiver.

4. Disconnector - Drawing # 4D

This is the linkage through which the rearward movement of the tripping lever is transferred to the secondary sear.

5. Pin-Disconnector and Tripping Lever - Drawing # 4E

The pin attaches the Disconnector to the Tripping Lever. It also acts as a pivot for the two parts. The pin is flared on both ends when installed to prevent the disconnector and tripping lever from coming apart.

6. Pin-Disconnector, Secondary Sear Engagement - Drawing # 4F

This pin is permanently attached to the disconnector and its purpose is to engage the secondary sear. When rearward movement is applied to the disconnector, the secondary sear is also moved rearward.

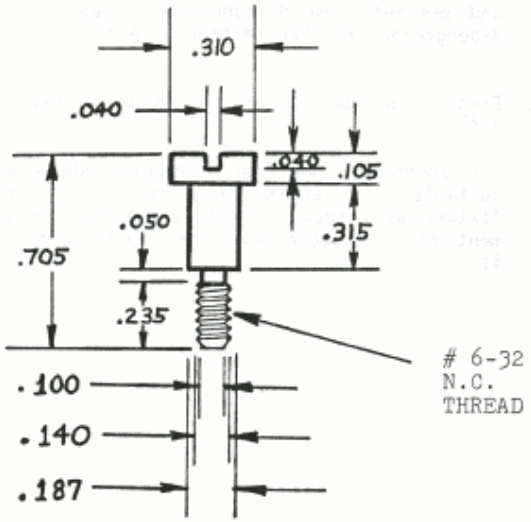
7. Clip-Retaining, Disconnector Pin - Drawing # 4G

The plastic clip attaches to the small diameter of the disconnector secondary sear pin,

and prevents the disconnector assembly from disengaging from the secondary sear.

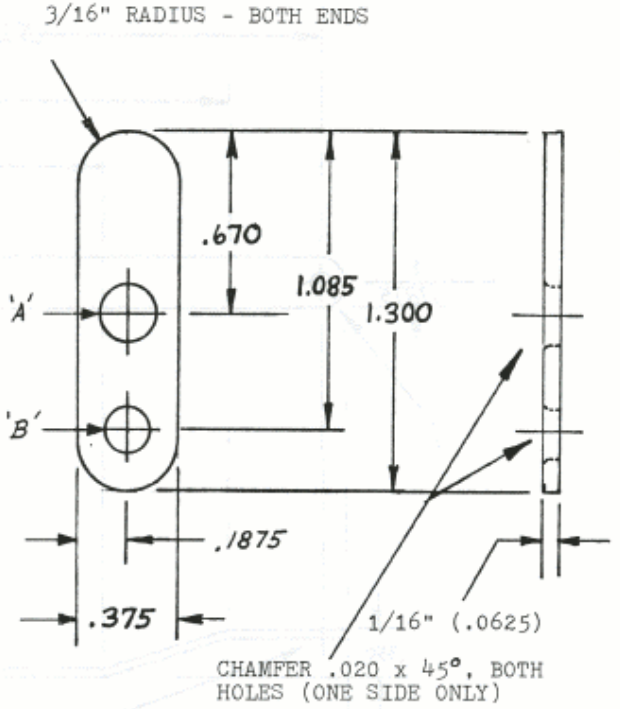
8. Fixture-Secondary Sear Machining - Drawing # 4H

The secondary sear has irregular shape not suitable for clamping in a mill vise. This fixture will securely hold and prevent movement of the secondary sear while machining it.



SCREW-PIVOT	
SCALE 2X	DRWG. NO. 4-A

42

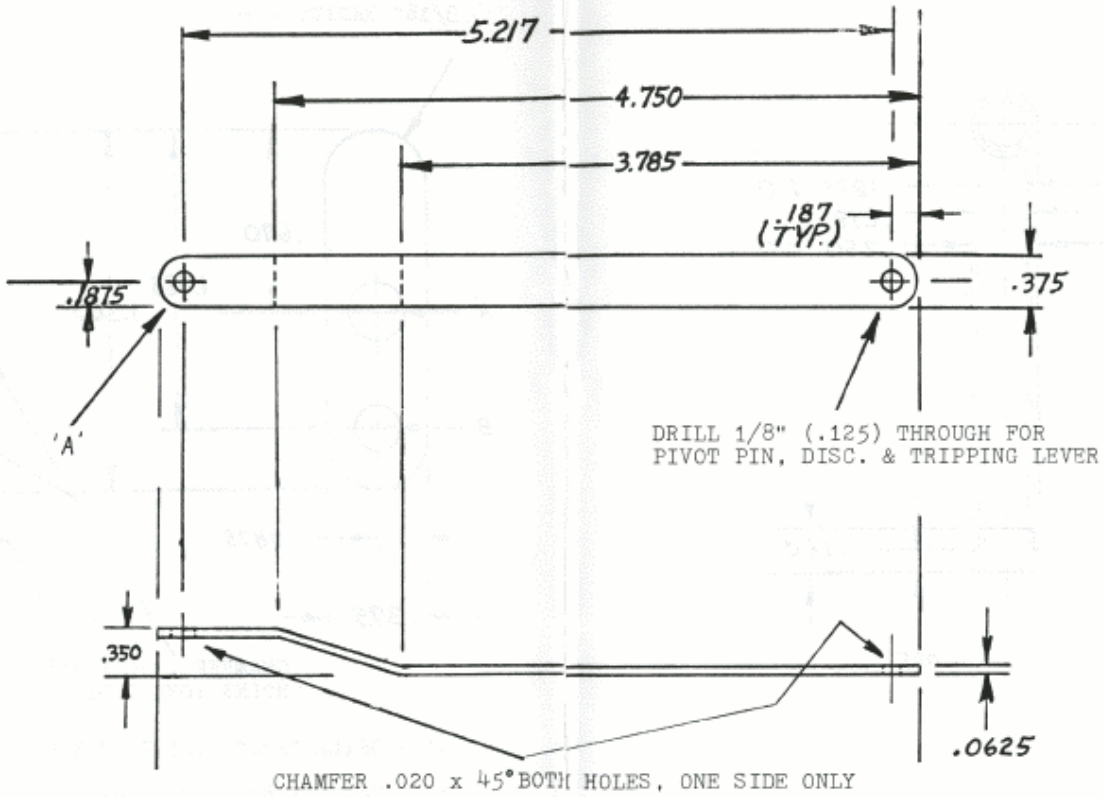


'A' - DRILL 7/32" (.2187) THROUGH

'B' - DRILL 1/8" (.125) THROUGH

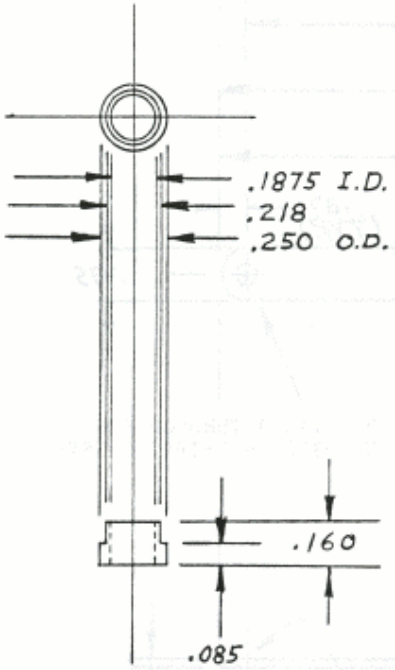
TRIPPING LEVER	
SCALE 2X	DRWG. NO. 4-B

43



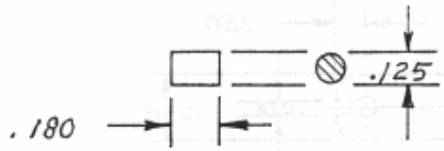
'A' - DRILL 11/64" (.1718) THROUGH FOR SECONDARY SEAR ENGAGEMENT PIN

DISCONNECTOR	
FULL SCALE	DRWG. NO. 4-D



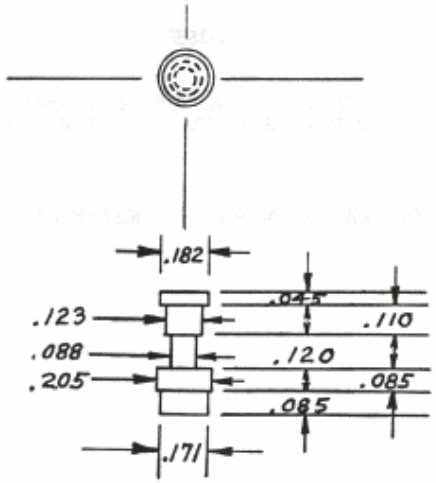
BUSHING - TRIPPING LEVER	
SCALE 2X	DRWG. NO. 4-C

46



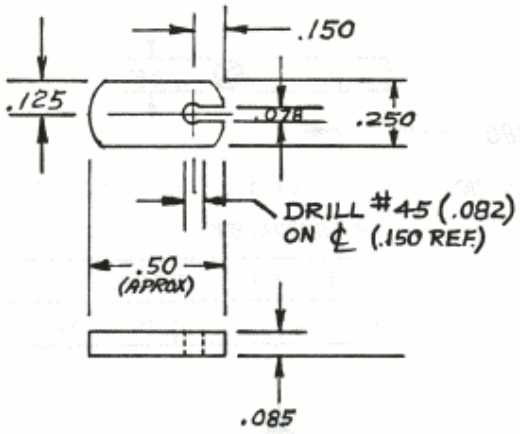
PIN CAN BE MADE FROM 1/8" DIA. DRILL ROD
OR EQUIVALENT

PIN-DISC. & TRIPPING LEVER	
SCALE 2X	DRWG. NO. 4-E



PIN-SEC. SEAR ENGAGEMENT	
SCALE 2X	DRWG. NO. 4-F

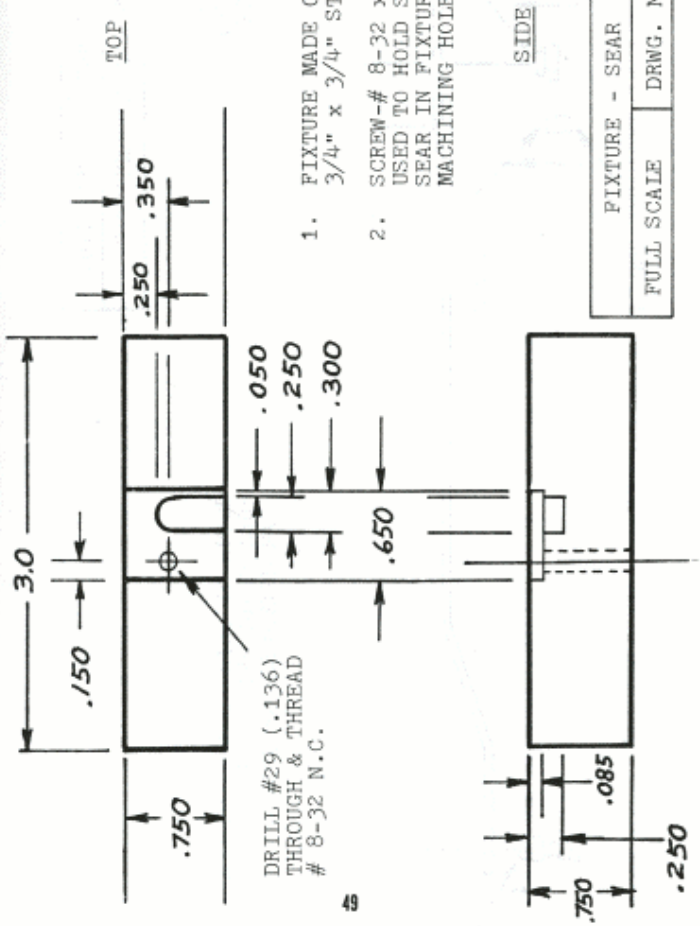
47

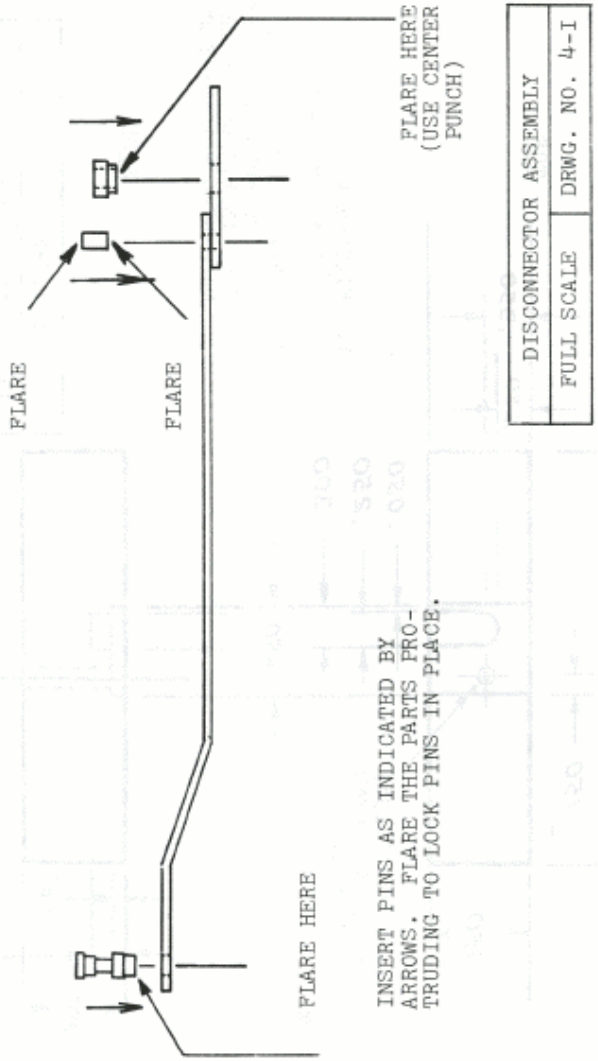


CLIP FITS ON .088 DIA. OF SEC. SEAR ENGAGEMENT PIN - PREVENTS PIN FROM COMING OUT.

* MAKE PART FROM PLASTIC MATERIAL

CLIP - RETAINING	
SCALE 2X	DRWG. NO. 4-G





5

Material For Construction

1. Screw-Pivot, Tripping Lever

   This screw can be either purchased or manufactured from a suitable material. Unhardened drill rod would be fine for this application since it machines well, and is easily obtainable.

2. Tripping Lever

   This part can be made from standard 1/16" thickness sheet metal.

3. Bushing, Tripping Lever

   This part can be made from almost any steel. Drill rod as used in #1 would be very good.

4. Disconnector

   The same material used for #2 can be used for construction of this part.

5. Pin-Disconnector and Tripping Lever

The same material used for #1 and #3 can be used to make this part.

6. Pin-Disconnector, Secondary Sear Engagement

Use the same material as #1, #3, and #5 for construction of this part.

7. Clip-Retaining, Disconnector Pin

The material used for this part can be almost any type of semi-flexible plastic such as DELRIN or NYLATRON. The only requirement is that this part be flexible or "springy" so that it can clip onto and retain its position on the pin, # 4F.

8. Fixture-Secondary Sear Machining

Any type of steel or aluminum can be used for this application.